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Distance as a predominant factor in the utilisation of health services in the Kumasi metropolis, Ghana

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ABSTRACT

The research primarily aims at testing a model, adapted from existing models, on the influence of distance on the use of health services in the Kumasi metropolis, an expanding urban centre in Ghana. Primary data, collected between August 2000 and February 2001, were used for the study. The data were analysed using a multiple regression model and compound bar graphs. A sample of 250, drawn through systematic random and stratified procedures, was used for the cross-sectional retrospective survey. Data were collected through formal interview schedules, after preliminary observational survey. The survey has established three principal findings. First, distance shows a strong inverse relationship with the utilisation of health services in the metropolis. Second, travel time and transport cost, variables that are related to distance, exhibit a weak negative and positive associations respectively with the use of health services. Third, the vulnerable groups of women, the aged, the sickly, the illiterate and the poor are not affected by distance decay in the utilisation of health services. Finally, independent variables that are statistically significant in influencing utilisation, alongside distance, are education, service cost, quality of service and health status. Recommendations for locational modelling of health services at the deprived periphery, an introduction of an insurance scheme to facilitate health care use, and recommendations for further research have been made.

INTRODUCTION

This paper is about the relationship between distance and the use of health services in an urban context. Most studies have revealed that distance shows an inverse relationship with the use of health services in both developed and developing countries. Yet, there are no uniform rates of decay as numerous factors have distorted the patterns (Giggs, 1983). These include the size of the facility, catchment area, range of services offered, transport availability, service cost and the nature of the health problem. Indeed, both consumer and facility attributes would interact to produce different reactions from different persons. There is yet the problem of unequal distribution of health facilities between the urban core and the periphery. This would result in patients at the periphery travelling to the core for health care, especially for specialist services.Women, who need specialist services like gynaecological services, would have to travel to the core. In the Kumasi metropolis in Ghana, the periphery lacks maternal and child health services, so women at the periphery would have to travel to the core where such facilities are available. There is also the factor of social distance in which health care users would prefer attending the facility based on social or ethnic relationships.

In developing countries, with particular reference to Ghana, however, studies have failed to identify confounding factors in distance decay. Moreover, studies have concentrated on distance without efforts to compare with related variables of travel time and transport cost. These two variables

correlate with distance, so could be used to confirm the distance factor. Transport cost would increase the overall cost of care in an area where incomes are low and a national health insurance scheme is lacking. Furthermore, in developing countries, not much has been done to compare distance with other factors influencing utilisation. The results of the survey will confirm, or disconfirm otherwise, existing surveys on the behaviour of health care users in urban settings.

It could be argued that the urban areas, due to their geographical contiguity, and their not being as vast as rural districts, do not face the problem of travel to health facilities. Yet, the poor health facilities at the urban margins, and the poor road network that links the urban margins with the urban core where health facilities are concentrated, need not be gainsaid as factors limiting utilisation by residents in such areas. Indeed, accessibility to health facilities in such urban margins could be as poor as in some rural settings.

Research questions that emerge from the foregoing discussions are fourfold:

1. Does distance exhibit an inverse relationship with utilisation of health services in the metropolis?
2. How does distance compare with the related variables of travel time and transport cost in the utilisation of health services?
3. How does distance compare with physical factors of travel time and quality of road, and demographic and socioeconomic factors that influence utilisation?
4. What are the vulnerable groups affected by the distance factor in the utilisation of health services?

The study objectives are basically two-fold. First, to examine how distance compares with other factors that influence utilisation of health services, especially the factors of travel time and transport cost that have direct bearing on distance. The second is to examine the effect of distance on vulnerable groups including women, the aged, the poor, the illiterate, and those with poor health status, i.e. the need factor. It is hoped that this study shall establish a framework and provide the baseline data for studying distance and use of health services in an urban context in Ghana, in particular, and other developing countries in general.

LITERATURE SURVEY

Not much work has been done on distance and health care use in developing countries since the early part of the last decade of the 20th century. Most works are concentrated in the 1980s and early part of the 1990s. The role of spatial factors in the use of health services can be studied at the aggregate or individual level. The aggregate level emphasises differential regional availability of services, whilst the individual level reflects the local accessibility of health care facilities to individuals whose personal mobility varies (Joseph and Philips, 1984). In the developing nations, works by Muller *et al.* (1998); Kinman (1999); Stock (1987); Frederiksen (1964); Wilson (1997), Bailey and Phillips (1990), Stock (1983), Smith (1979), Ganatra and Hirve (1994), Oppong and Hodgson, (1994) confirm the great impact of distance on utilisation of health services. In the developing nations, most people will not travel more than 5 km to receive basic preventive and curative care (Muller *et al.*, 1998). In a study of the effect of distance from home on attendance at a small rural health centre in Papua New Guinea, he found that attendance decreased markedly with distance. There was a 50% decrease of the number of patients at a 3.5 km distance.

For women the relationship between distance and utilisation is stronger due to the complications of their reproductive functions. Several studies have shown that women have higher morbidity than men (Anderson and Andersen, 1972; Kohn and White, 1976; Cleary *et al.*, 1982; Verbrugge, 1979). They are therefore more likely to seek more health care than men. This factor strengthens the effect of the distance problem on them. A 1994 World Bank Report indicates that in developing countries lack of transport, especially in remote areas, and poor road conditions can make it extremely difficult for women to reach even relatively nearby facilities. Walking is the primary mode of transportation, even for women in labour (World Bank, 1994). This condition also holds for periurban areas of developing countries. In Malawi, a study found that 90% of women wanted to deliver in a health care facility, but only 25% of them did. The most important reason they gave was that, by the time they realised they were in labour; they did not have enough time to get to a health facility (Lule and Ssembataya, 1996).

Campbell *et al.* (1991) and Carr-Hill and Sheldon (1991) confirmed the hypothesis that access to hospital services, in terms of distance, is a major factor influencing hospital use. Slack *et al.* (1997) observe that if services are accessible they will be utilised regardless of any notion of higher need for services. A corollary to this notion is that those with limited access to hospital services will have a

lower demand for treatment and may consequently suffer a greater unmet need. This situation applies to both developed and developing countries, and to urban and rural settings. Examining the rates of hospitalisation in the East Midland region of England in an attempt to look at the role of deprivation in access to services, Slack *et al.* (1997) found that both deprivation and travel time are significant influences on hospitalisation rates. Small areas that are more deprived, and closer to the hospitals, are more likely to have higher rates of hospitalisation.

Using focus group discussion,Wilson *et al.* (1997) found that distance from the hospital was, among others, one of the reasons for poor utilisation of the maternity home at Nsawam, an urban centre in Ghana. The Institute of Development Studies (IDS, 1978) showed that in the Jasikan district in Ghana, a rural district, distance decay played amajor role in health service utilisation. The report states that, in the Jasikan district, about 3/4 of all registered patients come from within 4 miles and that most people (over 90%) living within 4 miles do, in fact, register at a health unit. However, registration drops off quite sharply for those living farther away, and only about 1/10 of the population living more than 6 miles from a health facility appear to be registered at all in Jasikan.

In evaluating health service equity at a primary care clinic in Chilimarca, Bolivia, Kinman (1999) also discovered that, within the targeted service area, usage was concentrated in a few blocks of the community and generally diminished with increasing distance from the clinic. In Nigeria, Stock (1987) found that at a distance of 5 km from a dispensary, per capita utilisation fell to less than one-third of the 0-km rate. An Indian study also showed that the proportion of a community attending a dispensary decreased by 50% for every additional half-mile between the community and the facility (Frederiksen, 1964).

The geographical distance factor is strengthened by two related factors of transport cost and travel time. A long distance would involve a long travel time, depending upon the nature of road and transport. There is also the concept of transport cost. A longer distance could involve greater cost which has the potential of discouraging utilisation in a poverty-endemic region. Meise *et al.* (1996) saw time distance as a major obstacle to hospital attendance. Acton (1976) concludes in a study of the effects of waiting time on utilisation that the length of time the patient spends in waiting at a physician's office is an important time price that determines utilisation levels. Aday and Andersen (1974) also note that this negative effect on utilisation is greater for rural farm residents because they have been found to have the highest incidence of seeing a physician.

The same could be said about travel time which is directly related to geographical distance. A greater geographical distance might mean increased travel time, even if factors like traffic and poor roads are controlled for. Exceptions to this rule have been identified in various studies. In a study of locational and population factors in health careseeking behaviours in Savannah, Georgia, Gesler andMeade (1988) observed that though inner-city residents had shorter distances to travel, they might have taken a long time to reach health care. Shannon *et al.* (1973) made a similar observation in a similar study. Regarding cost of movement, Garner (1967) has discovered that the notion of accessibility is closely related to the concept of movement minimisation, especially when this is measured by costs involved in overcoming distance.

The distance factor is ultimately determined by poverty. Among the factors that affect utilisation of health services in the developing countries, poverty is predominant (Habib and Vaughan, 1986; Chernischovsky and Mesook, 1986; Pickett and Hanlon, 1990; Ensor and Pham-Bich-San, 1996; Delanyo *et al.*, 1990). The monetary factor in health service use is about the most important, and the cost of movement that is determined by distance comes into a sharp focus.

Some factors interfere with distance-decay. These include socio-economic status (Bailey and Phillips, 1990), quality of care provided, the nature of the illness and the affective behaviour of medical staff. In rural Nigeria for instance, Stock (1983) found that, people are willing to travel farther for more specialised services, or better quality care. The same could apply to urban centres. This factor of specialist services brings in disparity between men and women in their relationship with distance decay. The fact has been noted that women need health services more than men. Because of their childbearing role and the complications associated with it, women require specialist services. They would therefore be compelled to travel long distances to seek specialist services. This would apply to those living at the urban periphery where such facilities are normally lacking.

The quality of care provided can also alter the distancedecay mechanism. Smith (1979) in a similar study further confirms that, the decline in the use of health services with increasing distance to the

health facility will vary in relation to the type of services offered. In the study area, in order to seek specialist services, patientsmay like to move to the Komfo Anokye Teaching Hospital, which is at the centre of the metropolis, from the periphery, or from the core to a peripheral hospital like the Aninwaah Medical Centre (Figure 1) where certain specialist services are offered.

[FIGURE 1]

Distance decay may also be altered by the urgency of the service and by socio-cultural relationships. In a study on male bias in health care utilisation for under-fives in a rural community inWestern India, Ganatra and Hirve (1994) found that parents were willing to travel greater distance to seek medical treatment for their sons, but would not for their daughters[1]. The effect of distance can be enhanced or reduced by the nature of symptoms and illness suffered by patients (Girt, 1973). By implication, the stimulus to attend medical services will vary greatly between a non-urgent and an emergency visit to day accident and emergency facilities.

Social distance has also been found to have a significant effect on utilisation, barring the distance obstacle. Hays *et al.* (1990) observed in a survey of spatial patterns of attendance at general practitioner services in New Zealand that the Maori were less spatially bounded than other members of the sample and patients attended doctors who had been recommended by family and relations. Such recommendations were accorded greater importance than spatial considerations in attendance patterns. Roghmann and Zastowny (1979) andMorrill (1970) at separate studies confirmed the influence of social distance on utilisation. Gesler and Meade (1988) also observed that people who had lived in an area for a short time might have preferred to visit a doctor or clinic closer to their previous residence. Philips (1979) shares a similar view.

Distance decay could also be influenced by demography and socio-economic status. Joseph and Poyner (1982) indicate that both consumer and facility attributes would interact to produce different reactions from different persons. Distance may as a result have very different implications for individuals. Within this context lie educational and wealth status, as well as social distance. A study of Mangere in New Zealand concluded that, whilst distance decay generally influenced the use of health services, higher socio-economic groups were able to consult doctors further away (Burn, 1974). In Ghana the high illiteracy rate is more likely to affect utilisation. Unfortunately the government policy of Free and Compulsory Universal Basic Education (FCUBE) is not receiving the desired response. The affective behaviour of medical staff could also affect the distance factor. In Tanzania, a study found that 21% of women delivered at home because of the rudeness of the health staff even though they thought delivering in a health facility was safer (Biego *et al.*, 1995).

To some medical geographers, distance decay is more an intervening obstacle to health care use other than the major factor influencing its use. Kaliszer and Kidd (1981) for instance found that employment status, parity, and age were more important influences than accessibility, although they felt that greater distances than they examined might play a bigger role.

The literature concentrates on the primary role of distance in utilisation and the factors that affect distance decay. There is a dearth of data on the interrelationships between distance, travel time and transport cost, factors that are functionally related. There is also a dearth of data, especially in developing countries, on the position of distance among the various independent factors influencing utilisation. Finally, the effect of distance on utilisation of health services by vulnerable groups like women, the aged, and the poor has not received attention. These areas need emphasis in a study involving spatial patterns of health care behaviour in developing countries.

NATURE OF HEALTH SERVICES IN GHANA

Ghana practices the pluralistic health system, which is made of three sectors. These are the popular sector, the folk sector, and the professional sector. The popular sector includes all the therapeutic options that people utilise, without consulting either folk healers or medical practitioners. In the folk sector, individuals specialise in forms of healing that are either sacred or secular, or a mixture of the two. The popular and folk sectors tend to dominate, especially in the rural areas.

The professional sector comprises the organised, legally sanctioned healing professions, such as modernWestern scientific medicine. It includes not only physicians of various types and specialities, but also the recognised para-medical professions such as nurses, midwives, or physiotherapists. In

Ghana, a few medical doctors have entered into the area of folk medicine. A research institution on plant medicine has been established at Mampong Akwapim in the Eastern Region by government. The relationship between folk and professional healers tend to be marked by mutual distrust and suspicion.

The use of scientific health services is influenced largely by perception and social and ethnic relations. Among a significant proportion of the rural and illiterate population, especially among the aging population, there is a perception of the low potency of scientific medicine. The tendency to use traditional herbal medicine, which is sometimes influenced by magic, is strong. Certain diseases are perceived as due to the action of the 'gods'. In such cases, fetishism is resorted to instead of attending the hospital. Such diseases are considered as 'not-hospital-diseases'. Social, religious and ethnic biases also influence the use of health services. A patient may be willing to cover a longer distance to attend the hospital manned by a relative, the church he attends or a tribal member.

A problem of the health system in Ghana that influences utilisation is that there is no national health insurance scheme. There are few insurance systems run on local basis though. This problem starves the health sector financially. Government is the main financier of the health system, a factor that has affected development of the system. Saddled with financial crisis, government is unable to provide adequate funds to improve the health system. The proportion of the Gross National Product allocated the health sector in 2000 was 4.7% (The World Bank, 2000). Related to the insurance system is the introduction of the cash and carry system, which requires a patient to pay for the services rendered him at the hospital. The introduction of this system in 1985 has caused a substantial drop in utilisation. Service cost is thus a very important factor influencing utilisation.

Finally, the concentration of health facilities in the urban areas seriously affects utilisation in the rural areas. The rural and suburban areas, though, contain more than 60% of the national population, have less than 40% of all health facilities. The three most urbanised centres of Accra, Kumasi and Sekondi-Takoradi have more than 60% of all health facilities in Ghana (Ghana Ministry of Health [MOH], 1998). In the Ashanti Region, which is the most populous region, the capital, Kumasi, has more than 34% of all the health facilities in the region (Ghana MOH, 2000). The problem confronting the country in the utilisation of health services are thus poor economy, misguided perception, which is a function of illiteracy, poor allocation of health facilities, and poverty.

THEORETICAL FRAMEWORK

General frameworks have been structured for the distance factor in the utilisation of health services. The Andersen- Newman model (1973), which forms the foundation for several frameworks, fail to emphasise the spatial dimensions in utilisation, especially, relating to the urban setting. He emphasises the predisposing-enabling-need (PEN) factors in utilisation, which relate basically to the user. Dutton (1986) introduces structural barriers, which include distance in his framework, but fails to emphasise the aggregate factors in a multidimensional framework. It is a multi-criteria model but does not emphasise the role of distance-decay. Andersen's (1995) most recent work on utilisation only introduces health outcomes. The relationship between health care use and outcomes are very controversial. Besides, the peculiarities of various spatial settings that are related to utilisation have not been critically analysed.

Poland *et al.* (1990) use bivariate and logit analyses in the study of the ecology of health services utilisation in Grenada. He uses a form of ecological model in his study. The variables did not cut across the entire spectrum of accessibility and socio-economic and demographic factors that influence utilisation. The role of distance therefore could not be clearly deciphered to form a basis for a meaningful framework. Hays *et al.* (1990) attempted an optimal model, in a holistic framework, in the study of the spatial patterns of attendance at general practitioner services. In this study, very few variables were used in the distance study. Several socioeconomic and demographic variables were missing from the survey.

The literature recognises the major role distance plays in the utilisation of health services, whilst also conceding the impact of certain factors on distance decay. The impact of distance is dictated by human behaviour, which is in turn influenced by socio-economic and demographic backgrounds. In a study like this, a holistic model involving the characteristics of the user, the provider, and restrictive factors of which distance is a part is appropriate. A hypothetical model (Figure 2) that suits the study, adapted from a combination of the foregoing spatial and behavioural models, has been adapted for the study. It is an interaction of utilisation with provider characteristics, user characteristics and restrictive factors

that are a combination of government policy that determines service cost, location and distance coverage.

[FIGURE 2]

Utilisation is the dependent variable that is determined by the broad independent variables of provider characteristics, user characteristics and restrictive factors, all organised into a user environment. Patients with higher incomes are more likely to use specialist services that are more expensive. The need for a special service would defy distance decay. Provider characteristics of quality of service and affective behaviour of medical staff could influence utilisation, irrespective of the distance factor. A patient may be more willing to attend a health facility, which could better serve his needs, and where the staff are well behaved towards him than a nearer facility where he would not get the satisfaction he needs. Distance, either from the core or the periphery, would affect transport cost and travel time, which would influence utilisation. There is no cause-effect relationship here since human behaviour depends upon certain socioeconomic backgrounds. Distance could also have a direct effect on utilisation, irrespective of the effects of the interrelated variables. Finally, there are other restrictive variables that could affect utilisation. The survey is guided by the framework. All the variables of the framework need not be reflected in the survey.

The study is based on three *hypotheses*. First, distance is a predominant factor influencing the use of health services in the metropolis. Second, travel time and transport cost exhibit similar quantitative relationships with distance in the utilisation of health services. Greater distances would mean greater travel times and transport costs. Third, women, the aged, the poor, the illiterate and the sickly are the vulnerable groups that would be more influenced by the distance factor in utilisation.

DATA AND METHODS

The survey is an empirical cross-sectional covering a growing metropolis in Ghana, the Kumasi metropolis. A sample of 250, representing 0.02% of the metropolitan population is used for the study. The sample was drawn from 7 settlements, both core and periphery. The core settlements are Asafo and Bantama, and the peripheral settlements being Boadi, Kaase, Kwame Nkrumah University of Science and Technology, Nyankyerenease and Santase (Figure 1). The selection was to ensure spatial balance. It also ensured a balance in the distribution of health facilities that are concentrated at the core. The sample sizes are 100 for the urban core settlements, and 150 for the periphery. Stratified and systematic sampling procedures were used for the data collection. The stratification factors are age, sex, education and income. In the selection of the settlements, the level of accessibility to health institutions was considered. Formal interview and questionnaire instruments were respectively applied on the illiterate and literate. Some of the literate preferred the formal interview to avoid the problem of callbacks.

The selection of houses for locating the respondents was by systematic random sampling, and the selection of the respondents by both simple random and purposive sampling.

A balance of the stratification factors was needed; so, where one factor was under-represented, the purposeful procedure was used to ensure a balance. This was a possible source of bias. The other sources of bias were the non-cooperativeness of 10 persons, and the non-response to some of the questions, such as those relating to marital status. These biases would not have a significant impact on the results, since those involved were few.

The independent variables used for the study were distance, travel time, transport cost, quality of road, income, waiting time, quality of service, age, sex, educational status, number of children, insurance status, and health status. Travel time, waiting time, quality of road, and distance constitute the physical factors of accessibility, whilst the other factors could be organised under predisposing, enabling, and need factors, and provider characteristics. Utilisation is the dependent (outcome) variable.

Distance is defined as the distance covered to the health service utilised more regularly whilst travel time in the questionnaire was defined as the time taken to cover the distance by a vehicle from ones' home to the location of the facility. Transport cost as defined in the questionnaire is the cost of movement by a vehicle to and froma hospital, whilst income is the monthly income of a household. For those not earning regular monthly incomes, expenditure was used as proxy. Waiting time is

defined as the time spent between the time a respondent arrived at a hospital and the time he is invited to a consulting room to see a doctor. For quality of service, respondents were asked to indicate their opinion based on indicators like, waiting time, time taken for consultation, laboratory services, affective behaviour of medical staff and availability of drugs. Age is defined as age at the last birthday, whilst educational status is defined as completed educational level. The number of children is explained as the dependents of a respondent. For insurance status, fully insured and partly insured are defined as insured. The partly insured are those who enjoy free medical care from their workplaces. Services for this category do not cover as broad category of services as the fully insured who pay premiums. They nevertheless enjoy free basic services including surgery that is very expensive. Health status is defined in the questionnaire as the number of times a person fell sick. The periodicity of sickness was used as an indicator for assessing health status. Utilisation is defined as the number of times a person attended hospital/health centre the last three times he/she fell sick.

Both nominal and ranked data were used for the variables. Income, distance and age were entered as continuous variables, whilst sex and insurance status were entered as nominal data. Male was given a code 0 and female 1, and uninsured 0 and insured 1. Health status, quality of road, quality of service, educational status and utilisation were entered as ranked (ordinal) data. For utilisation, the number of attendances at a hospital or health centre the last three times a respondent fell sick was used as a measure. The ranks were 0–3; 0 being rarely, 1, irregularly, 2 moderately, and 3, regularly. Health status is assessed as the number of times a respondent fell sick. The ranks were 1–5, ranging from 1 for once a week, and 5 being rarely. Quality of service was as determined by respondents, who were guided by factors that determine quality. The ranks were 1–4, ranging from 1 for poor, and 4 for very good. Educational status was assessed as the highest level of education attained. Neverbeen- to-school was given a value of 1, basic education, 2, secondary education 3, and tertiary education 4.

Multiple regression is used for the analysis. This is preceded by cross-tabulation of distance and the other independent variables. This was to find out whether there were linear relationships between these variables and utilisation. Multiple regression is appropriate for the analysis since the variables are mostly continuous and ranked (ordinal). Bivariate correlations have also been used to show the strength of association between utilisation and distance and other study variables. The stepwise method has been used to eliminate the variables that have no significant effect on utilisation, whilst Kendall's tay-c test has been used to show whether there are significant differences among the sub-variables of age, sex, education, health status and income (at ≤0.05 probability) and utilisation by distance. Bar graphs are used to show the differences in utilisation among the related variables of distance, travel time and transport cost.

DISTRIBUTION OF THE STUDY VARIABLES

The distribution of the study variables is indicated in Table 1. Greater proportion of the respondents cover less than 3 kmto attend hospital[2], whilst over 5% cover more than 10 km for health care. Over 73% cover up to 5 km to seek health care. Major road is the main road network used to access health services. Mean travel time, though low, shows a high SD, meaning a considerable disparity among respondents. Mean waiting time of over 2 h is quite considerable, whilst the SD of service cost is close to the mean service cost of ¢39,622 ($5.66), indicating a great disparity among respondents in the price paid for health care.

[TABLE 1]

The respondents are predominantly economically active. The sex ratio is a faint reflection of the national sex ratio. Mean income of ¢563,947.4 ($80.56) is below the SD, implying marked variation in income. The mean number of children of 3.86 is below the national Total Fertility Rate (TFR) of 4.6 (Ghana Statistical Service, 1999). Quality of service is generally good, whilst health insurance status is poor. Only 4% are fully insured. Utilisation of health services in the metropolis is not generally encouraging. Almost 63% do not utilise health services regularly. Finally, the health status of the respondents is generally good, with 66% either rarely falling sick, or falling sick in every 3 months.

RESULTS

Distance shows a strong inverse relationship with utilisation as indicated by the compound bar graph (Figure 3). There is relatively a steep distance-utilisation gradient. Utilisation declines as distance increases. The gradient is less steep for travel time whilst transport cost exhibits a positive relationship with utilisation, so has no impact on it (Figures 4 and 5). The bivariate correlations depict similar relationships. Whereas the correlation is −0.276 (0.01 Sig.) for distance, it is −0.058 for travel time and 0.123 for transport cost. A multiple regression model of utilisation shows a similar relationship (Table 3).

[FIGURE 3-5]
[TABLE 3]

A multiple regression model was used to show the position of distance among the various factors that influence utilisation. This was found necessary in the formulation of a policy framework. Multiple regression analysis is preceded by correlation analysis (Table 2) [pp. 29–30]. The associations between various variables and utilisation are stronger for educational status, insurance status, service cost and income than for distance. The correlations are significant at 0.01 probability. Education exhibits the highest association of 0.428.

[TABLE 2]

The Regression coefficients are indicated in Table 3. Travel time and number of children were eliminated because of their strong association with other variables to avoid the problem of multicollinearity. Whereas the correlation between travel time and distance is 0.744, that between number of children and age is 0.709. Distance was retained because it is the theme of study and assumes a great importance in the analysis of utilisation of health services in developing countries, whilst number of children was eliminated in favour of age because age is a strong predisposing factor in utilisation.

The stepwise method was used as a means of confirming the position of distance and the other factors in explaining utilisation behaviour. The results are indicated in Table 3. Five variables are identified as being significant predictors. These are education, distance, service cost, quality of service and health status, following an order of importance. Distance shows an inverse relationship with utilisation of health services at a high probability of 0.000 at a coefficient of −0.291. The coefficient is however lower than education, which has a coefficient of 0.327. The implication is that, education is the only variable that exceeds distance in explaining the greater proportion of utilisation. Distance thus occupies a significant position in the utilisation model. The model has a modest adjusted coefficient of determination of 0.352, a common measure of the goodness of fit of a regression model. Other variables that have a probability of 0.05 or less, so are significant in explaining the utilisation model alongside distance and education are service cost, service quality and health status. Although the correlation coefficient between income and utilisation of health services is 0.342, it does not emerge as a significant variable, using stepwise procedure. One reason for this situation is the effect of service cost. If service cost is removed form the variables, income emerges as a significant variable. The other reason may be that, in the metropolis, a good number of the respondents either enjoy full health insurance or receive some subsidy on health costs from their employers. This area requires further research.

For the feasibility of policy initiatives, the relationship between distance and utilisation has been separately analysed by gender, age, literacy, income and health status. Specifically, the study targets vulnerable groups for policy initiatives on the distance problem. The vulnerable groups are women, the aged, the illiterate, the poor, and the sickly. The impact of the distance factor on the vulnerable groups is indicated in Tables 4–8.

[TABLES 4-8]

Males are more affected by distance in the utilisation of health services than females, as indicated by the Kendall's tau-c results. The economically active age group, 18–59, is more affected by distance than the aged. Whereas the Kendall's tau-c value for the economically active is −0.308, that for the aged is −0.241. The literate, as indicated by the results, take greater advantage of nearer health facilities than the illiterate. Consequently, the literate are more influenced by distance decay.Whereas the Kendall's tau-c value for the literate is −0.347, it is −0.205 for the illiterate. An important factor to note in the survey with regard to the vulnerable groups is that, they all, apart from the sickly, utilise health facilities less (Table 10) [p. 38].

[TABLE 10]

DISCUSSION

The survey has clearly revealed that there is an inverse relationship between distance and utilisation of health services in the Kumasi metropolis. Though with a modest adjusted coefficient of determination of 0.352, a common measure of the goodness of fit of a regression model, it could be concluded that the model nevertheless has succeeded in giving a clear picture of the predominant position of distance in the utilisation of health services in the metropolis. The respondents tend to use health facilities nearer them, hence, supporting the hypothesis that distance has a negative effect on utilisation. In relative terms, distance is a predominant factor in the use of health services in the metropolis. Most of them use facilities within a 3-km radius. This has been the trend in developing countries. Education however has a stronger relationship with utilisation than distance, whilst the influence of service cost, quality of service, income and health status (need) is significant. In a multiple regression framework (stepwise), transport cost is eliminated as insignificant. It has no influence on utilisation by distance, whilst travel time exhibits a weak negative association with utilisation.

What emerges from the survey is that, distance is the sole physical accessibility variable that influences utilisation, and a very important factor among the independent variables that influence utilisation of health services. Since distance is related to transport cost and travel time, it would have been expected that these variables would exhibit inverse relationships with utilisation, as distance does. However, they do not. Travel time shows a weak negative relationship with utilisation. The reason for a weak negative association between travel time and utilisation is that, the metropolis is not very extensive, so it does not take long, as in the rural areas, to reach a health facility.

As regards transport cost, it could be explained that, they are generally low in the metropolis. There has been fuel price stability, a factor that determines transport cost, for almost two years. Transport cost covers a very insignificant proportion of minimum wage, and would not prevent attendance at the hospital. Moreover, in the metropolis, earning power is much greater, so the low cost of transport could be borne by the low-income earner. The key factor is thus distance.

When comparing distance with other factors, it is clear that it plays a major role. Education is the only factor that assumes a greater significance than distance. Other factors that exhibit significant relationships with utilisation are also factors that affect distance decay. These are education, service cost, service quality, and health status, and these are inter-related. The educated are more likely to have access to high income and insurance that are enabling factors in utilisation. They are also able to take prompt and positive decisions about utilisation, being aware of the implications of ill health. In a hospital where service cost is low, patients may be more prepared to overlook the distance factor and attend. As evident in the survey results, service cost is an important factor in utilisation in the developing countries. Quality of service and health status could also defy distance decay.

The vulnerable groups of women, the aged, the sickly, the illiterate and the poor are not more greatly influenced by the distance factor as was hypothesised. They are influenced less by distance decay than the other groups. Incidentally however, these vulnerable groups, apart from the sickly, utilise health services less. Certain conclusions could be drawn from these results. First, these vulnerable groups gen erally lack the enabling capacity to utilise health services. This is indicated by the wide disparity between the poor and the rich in the utilisation of health services. It may not be due to distance. The other consideration is that the vulnerable groups may be in need of specialist services that could not be

within easy reach. In this case the distance decay factor would be of no effect. These areas need further investigation.

The framework could not be fully justified. Transport cost has not been validated by this research as influencing utilisation, though a related variable. Distance, has been found as a very significant factor that influences utilisation. Second, the user characteristics of age and sex do not have an influence on utilisation. Third, affective behaviour of medical staff does not influence utilisation. The survey did not justify certain hypotheses. The first is that transport cost, a factor related to distance, does not show an inverse relationship with utilisation, and the association between travel time and utilisation is weak. The second is that the vulnerable groups of women, the aged, the sickly, the illiterate and the poor are not influenced by the distance decay factor. It has however strongly established the predominant role of distance in the utilisation of health services.

Certain policy implications emerge from the survey. First, since most respondents patronise health services at distances of less than 3 km, the peripheral areas of the metropolis that are starved of health facilities must receive priority attention in the provision of health centres and other health facilities. A 3-km utilisation model is recommended. In this, primary health care centres within 3-km radius that are to be manned by medical assistants is recommended, especially at the periphery that lacks health facilities. Second, since utilisation is generally low in the metropolis in general, and for most vulnerable groups in particular; and since there is such a wide disparity in regular utilisation between low and high-income earners, the introduction of a National Health Insurance Scheme is recommended. Third, access roads from the periphery to the core of the metropolis must be improved, to facilitate movement to the core for specialist services. Finally, since education has come out clearly as the most important factor affecting utilisation, it is recommended that the government policy of Free and Compulsory Universal Basic Education (FCUBE) be fully implemented.

CONCLUSION

Distance, a predominant factor in health care utilisation, has been found to show a strong inverse relationship with the utilisation of health services in the Kumasi metropolis. With the metropolitan margins starved of health facilities, and the distance factor being predominant, the danger of self-medication is never in doubt. Such a trend negates the principle of equity in health care. The problem of distance is at tandem with the major factors that influence utilisation: education, service cost, quality of health care and health status. Any policies used to address the distance factor should therefore be holistic, involving all such factors. Since the whole problem hinges on finance, a National Health Insurance Scheme and a comprehensive poverty alleviation programme are urgent.

The research has not delved into the health implications of the restrictive factor of distance. What are the implications of the distance factor for health status? What health problems defy the distance factor in the utilisation of health services? It has not justified the influence of distance decay and utilisation by vulnerable groups. Is the principal factor affecting these vulnerable groups lack of financial capacity to utilise health services, a lack of need or the use of non-conventional intervening facilities? These are areas for further research in the entire syndrome of utilisation of health services in urban environments. This paper has provided a broad framework for the study of the relationships between distance and other factors influencing utilisation. Not all the variables have been tested by this survey, though, it is hoped it will serve as a baseline framework allowing other works on distance and utilisation of health services to emerge.

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ENDNOTES

1. In the study area, parents put a premium on their male children, so give them better attention in terms of education and health care.
2. Hospital in this context is used to denote health institution patients attend for health care. Hospitals and health centres are the predominant health institutions in the metropolis.

TABLES AND FIGURES

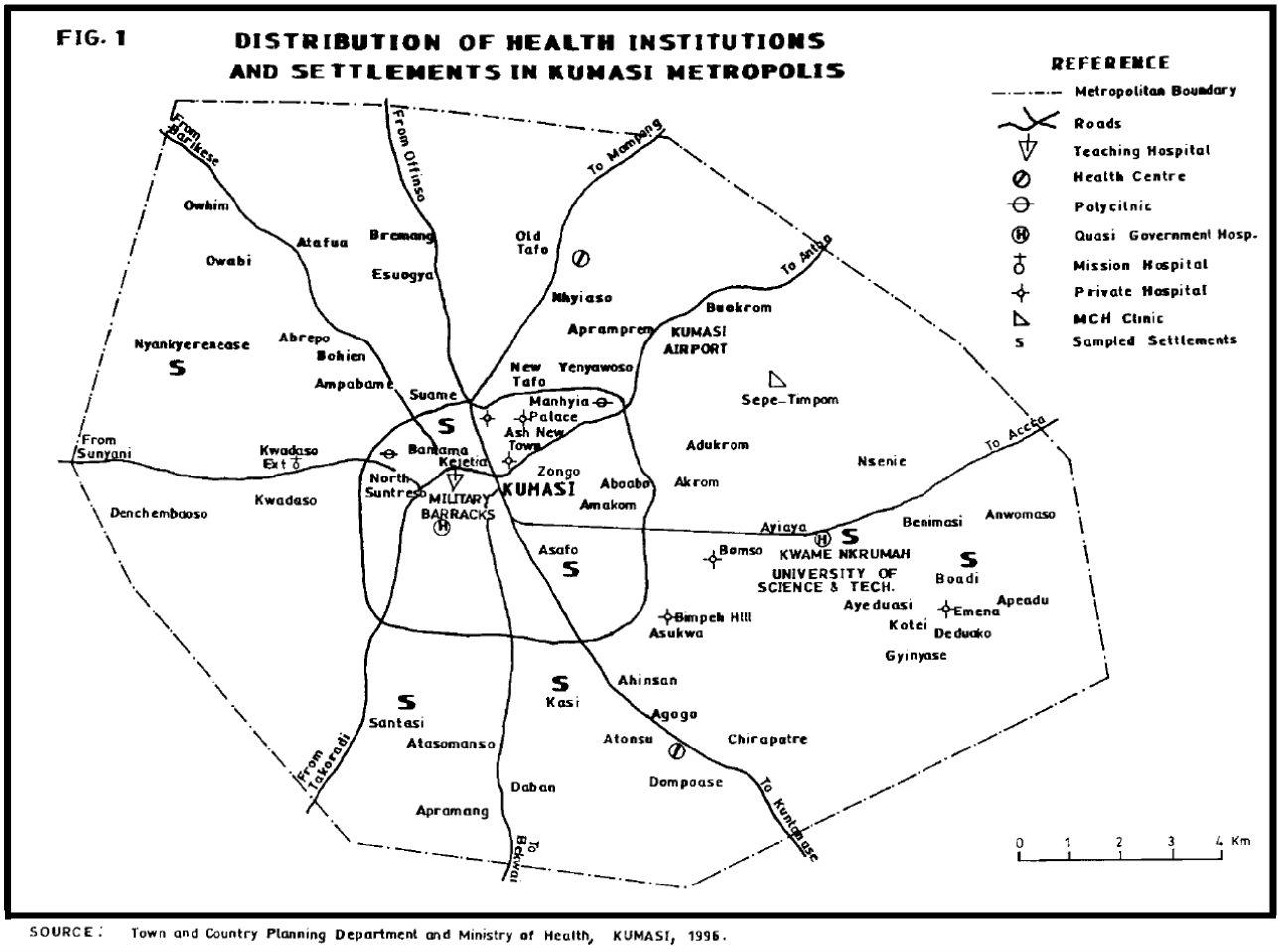


Figure 1. Distribution of health institutions and settlements in Kumasi metropolis.

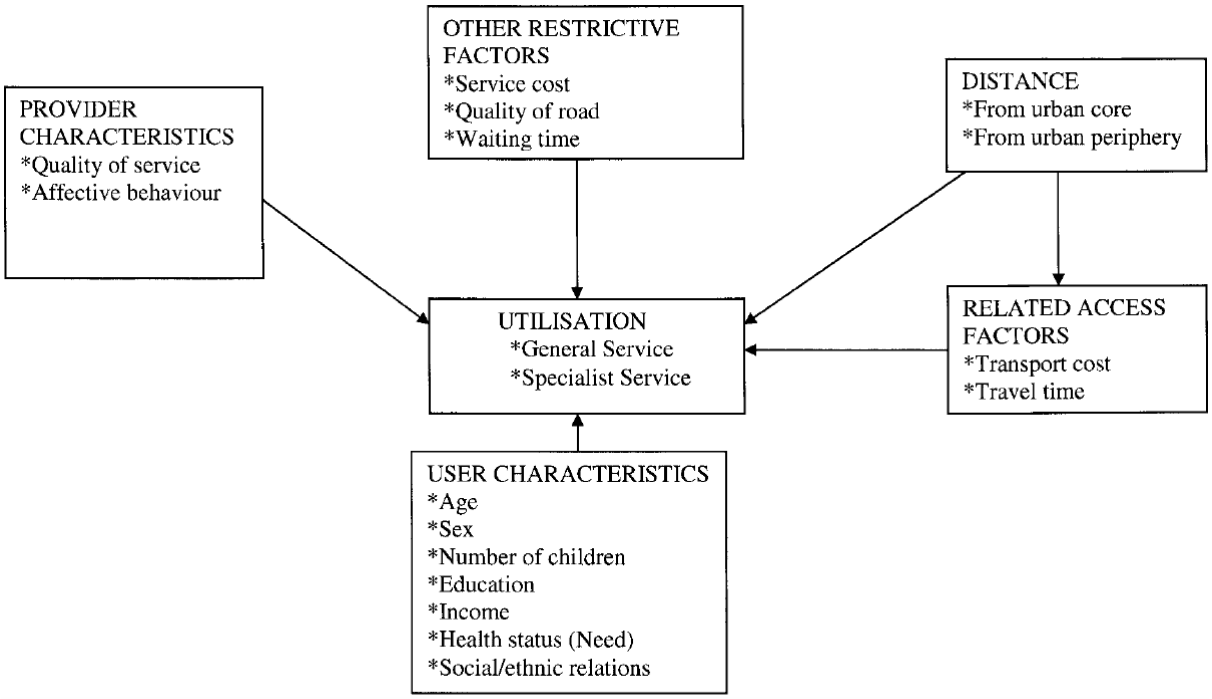
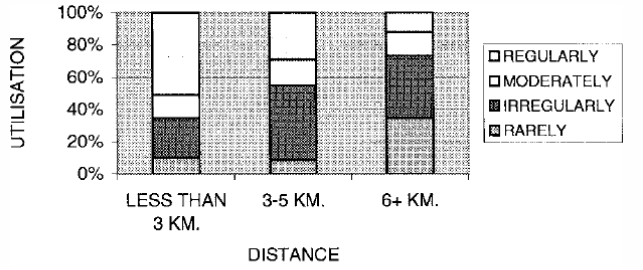


Figure 2. A hypothetical model for the study of distance and use of health services in the Kumasi metropolis.

Table 1. Distribution of study variables.

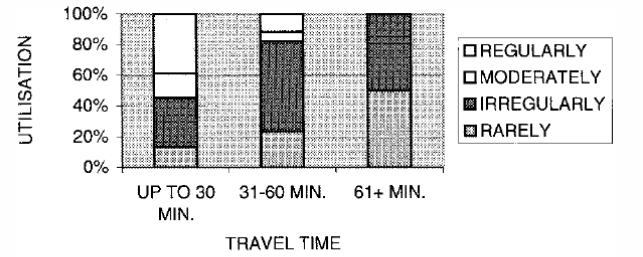
Variables	Values
Age (Mean; SD)	42.10; 15.47
Sex (%)	
Male	40.00
Female	60.00
Educational status (%)	
Never-been-to-school	29.6
Primary	28.0
Secondary	28.8
Tertiary	13.6
Income per month (¢'000s)[%][a]	
Below 100	4.5
100-199	18.2
200-299	12.1
300-499	26.7
500+	38.5
Mean	563947.4
SD	638185.2
SE	40606.8
Missing [3][b]	
Health insurance status (%)	
Uninsured	72.4
Insured	27.6
Frequency of sickness (%)	
Once a week	1.2
Once in 2 weeks	4.8
Once a month	28.0
Once in 3 months	30.4
Rarely	35.6
Distance (in km.) [%][c]	
Less than 3	48.8
3-5	25.0
5-9	20.6
10-19	4.0
16+	1.6
SD	4.5
SE	4.1
Status of road (%)	
Minor road	21.4
Secondary road	6.7
Major road	71.8
Service cost (in ¢) [Mean; SD]	39622; 29337
Transport cost (in ¢) [Mean; SD]	1848; 3315
Travel time (in minutes) [Mean; SD]	15.9; 15.6
Waiting time (in minutes) [Mean; SD]	124.1; 86.06
Number of children [Mean]	3.86
Quality of service (%)	
Poor	2.4
Satisfactory	35.2
Good	53.0
Very Good	9.3
Missing [3]	
Utilisation (Dependent Variable) [%]	
Not at all (Rarely)	14.4
Once (Irregularly)	33.6
Twice (Moderately)	14.8
Always (Regularly)	37.2

[a]The exchange rate was $1=¢7,000
[b]Missing numbers are absolute values, not percentages.
[c]Distance was entered as a continuous variable.
Source: Based on Field Data, 2001.



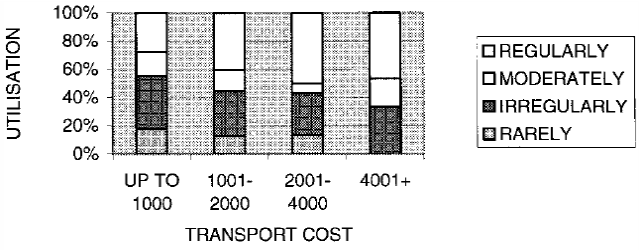
SOURCE: Based on Field Data, 2001.

Figure 3 Distance and utilisation of health services in Kumasi.



SOURCE: Based on Field Data, 2001.

Figure 4 Travel time and utilisation of health services in Kumasi metropolis.



SOURCE: Based on Field Data, 2001.

Figure 5. Transport cost and utiolisation of health services in Kumasi metropolis

Table 2. Correlation matrix for distance and other variables influencing utilisation.

Variable	Variable/Correlation							
	Distance	Trav. time	Wait. time	Road qual.	Sex	Age	Education	Health status
Distance	1.000							
Trav Time	0.744**	1.000						
Wait. Time	0.020	0.095	1.000					
Road Qual.	−0.282**	−0.235**	0.162*	1.000				
Sex	−0.015	−0.025	0.044	0.041	1.000			
Age	0.054	0.067	0.030	0.051	−0.121	1.000		
Education	−0.057	−0.058	−0.159*	0.132*	−0.060	−0.349**	1.000	
Health stat.	−0.084	−0.058	0.059	−0.094	−0.242**	−0.207**	0.228**	1.000
No. Child.	0.070	0.087	0.063	0.107	−0.120*	0.709**	−0.369**	−0.181**
Serv. Cost	0.115	0.103	0.017	−0.092	0.031	0.039	−0.359**	−0.079
Transp. Co.	0.123	0.182**	−0.128*	0.051	0.017	−0.007	0.142*	−0.028
Insurance	−0.140*	−0.161*	−0.148*	0.114	−0.111	0.028	0.387**	0.079
Income	0.093	−0.066	−0.213**	0.093	−0.063	0.012	0.419**	−0.013
Staff Attit.	0.117	0.033	−0.432**	−0.099	−0.097	0.064	−0.198**	−0.033
Service Qu.	−0.003	0.030	−0.281**	0.089	0.003	0.052	0.034	−0.104
Utilisation	−.276**	−0.058	−0.113	0.157*	0.035	−0.096	0.428**	−0.036
	No. children	Service cost	Transport cost	Insurance	Income	Staff attitude	Service quality	Utilisation
Distance								
Trav Time								
Wait. Time								
Road Qual.								
Sex								
Age								
Education								
Health stat.								
No. Child.	1.000							
Serv. Cost	−0.006	1.000						
Transp. Co.	0.047	−0.029	1.000					
Insurance	0.029	−0.663**	0.006	1.000				
Income	0.022	−0.316**	0.133*	0.355**	1.000			
Staff Attit.	0.033	−0.139*	0.122	0.210**	0.255**	1.000		
Service Qu.	0.009	0.021	0.154*	0.016	0.205**	0.541**	1.000	
Utilisation	−0.135*	−0.397**	0.136*	0.379**	0.342**	0.117	0.210**	1.000

**Correlation is significant at 0.01 level (2-tailed)
*Correlation is significant at 0.05 level (2-tailed)
Source: Based on Field Data, 2001.

Table 3. Multiple regression (stepwise) factors for independent variables.

Model	Beta coefficients	Significance	R	R^2	Adjusted R^2
1. Education	0.401	0.000	0.401	0.161	0.157
2. Education	0.385	0.000	0.531	0.282	0.275
Distance	−0.347	0.000			
3. Education	0.305	0.000	0.572	0.327	0.318
Distance	−0.309	0.000			
Service cost	−0.231	0.001			
4. Education	0.303	0.000	0.595	0.355	0.343
Distance	−0.296	0.000			
Service cost	−0.239	0.000			
Service Quality	0.168	0.002			
5. Education	0.327	0.000	0.605	0.366	0.352
Distance	−0.291	0.000			
Service cost	−0.241	0.002			
Service quality	0.156	0.004			
Health status	0.109	0.049			

Source: Based on Field Data, 2001.

Table 4. Sex and utilisation of health services by distance (%).

Distance in km	Sex/utilistaion (%)											
	Male				Female				Total			
	0	1	2	3	0	1	2	3	0	1	2	3
Less than 3	11.5	25.0	5.8	57.7	8.8	25.0	20.0	46.3	9.8	25.0	14.4	50.8
3-5	11.1	48.1	11.1	29.6	7.1	45.2	19.0	28.6	8.7	46.4	15.9	29.0
6+	42.9	38.1	9.5	9.5	28.6	39.3	17.9	14.3	34.7	38.8	14.3	12.2

Source: Based on Field Data, 2001.
Note: Codes for utilisation: 0 = rarely; 1 = irregularly; 2 = moderately; 3 = regularly.

Table 5. Age and utilisation of helath services by distance.

Distance in km	Age/utilistaion (%)											
	18–59				60+				Total			
	0	1	2	3	0	1	2	3	0	1	2	3
Less than 3	6.4	24.8	14.7	54.1	26.1	26.1	13.0	34.8	9.8	25.0	14.4	50.8
3–5	5.6	48.1	16.7	29.6	20.0	40.0	13.3	26.7	8.7	46.4	15.9	29.0
6+	11	42.1	13.2	15.8	54.5	27.3	18.2	0.0	34.7	38.8	14.3	12.2

Source: Based on Field Data, 2001.

Table 6. Income and utilisation by distance.

Distance in km	Income/utilistaion (%)															
	Less than ¢300,000				¢300,000-600,000				¢601,000+				Total sub-sample			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Less than 3	15.9	56.1	13.4	14.6	4.8	28.6	28.6	38.1	0.0	0.0	25.0	75.0	9.8	25.0	14.4	50.8
3–5	33.3	54.8	9.5	2.4	20.0	10.0	5.0	65.0	0.0	0.0	0.0	0.0	8.7	46.4	15.9	29.0
6+	44.4	43.8	6.2	5.6	15.9	27.0	14.3	42.9	0.0	0.0	40.0	60.0	34.7	38.8	14.3	12.2

Source: Based on Field Data, 2001.

Table 7. Literacy and utilisation of health services by distance.

Distance in km	Literacy/utilistaion (%)											
	Illiterate				Literate				Total sub-sample			
	1	2	3	4	1	2	3	4	1	2	3	4
Less than 3	25.0	32.5	17.5	25.0	3.3	21.7	13.0	62.0	9.8	25.0	14.4	50.8
3–5	23.5	35.3	17.6	23.5	3.8	50.0	15.4	30.0	8.7	46.4	15.9	29.0
6+	41.2	52.9	5.9	0.0	31.3	31.3	18.8	18.8	34.7	38.8	14.3	12.2

Source: Based on Field Data, 2001.

Table 8. Health status and utilisation by distance.

Distance in km	Health status/utilisation (%)															
	Once a month				Once in 3 months				Rarely				Total sub-sample			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Less than 3	10.8	40.5	24.3	24.3	0.0	55.6	18.5	25.9	23.3	51.2	9.3	16.3	9.8	25.0	14.4	50.8
3–5	21.1	31.6	15.8	31.6	29.2	45.8	4.2	20.8	36.8	42.1	5.3	15.8	8.7	46.4	15.9	29.0
6+	41.9	36.0	8.1	14.0	34.9	30.2	12.7	22.2	29.3	47.6	7.3	15.9	34.7	38.8	14.3	12.2

Source: Based on Field Data, 2001.
Note: Health status is assessed by the average period a respondent fell sick, six months prior to the interview.

Table 9. Kendall's Tau-C Test results.

Variable/sub-variables		Value	Approx. sig.
Sex	Male	−0.354	0.000
	Female	−0.261	0.000
Health status	Falls sick once a month	−0.267	0.005
	Falls sick once in three months	−0.202	0.034
	Rarely falls sick	−0.375	0.000
Age	18–59	−0.308	0.000
	60+	−0.241	0.049
Income	Less than ¢300,000	−0.192	0.049
	¢301,000–600,000	−0.356	0.000
	¢601,000+	−0.251	0.007
Literacy	Literate	−0.347	0.000
	Illiterate	−0.205	0.024

Source: Based on Field Data, 2001.

Table 10. Patterns of utilisation of health services* by socio-economic and demographic variables.

Variables	Sub-groups	Utilisation (%)
Sex	Male	40.0
	Female	35.3
Health status	Sick once a month	37.6
	Sick once in three months	38.2
	Scarcely gets sick	36.0
Age	0–59	20.4
	60+	13.6
Income	Less than 300,000	7.7
	300,000-600,000	46.2
	601,000+	66.7
Literacy	Illiterate	18.9
	Literate	44.9

Source: Based on Field Data, 2001.
*Utilisation here refers to the proportion of the sub-variable that utilises the services regularly.

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